

*CLAIM AMENDMENTS*

1. (Currently Amended) A semiconductor device comprising:  
a substrate;  
a gate insulating film ~~formed~~ on said substrate, and ~~having~~ including one of a  
nitrogen-containing metal silicate film ~~or~~ and a nitrogen-containing metal aluminate film that  
contains a metal in a peak concentration ~~of 1 in a range from one~~ atomic % ~~or more and 30 to~~  
thirty atomic % ~~or less~~ on the uppermost layer; and  
a gate electrode ~~formed~~ on said gate insulating film.
2. (Currently Amended) A semiconductor device comprising:  
a substrate;  
a gate insulating film ~~formed~~ on said substrate, and ~~having~~ including:  
a base interface layer ~~formed~~ on said substrate,  
a metal silicate film ~~formed~~ on said base interface layer, and containing a  
metal, oxygen, and silicon, and  
a nitrogen-containing metal silicate film that contains a metal, oxygen, silicon,  
and nitrogen; and  
a gate electrode ~~formed~~ on said gate insulating film, wherein said nitrogen-containing  
metal silicate film contains said metal in a peak concentration ~~of 1 in a range from one~~ atomic  
% ~~or more and 30 to thirty~~ atomic % ~~or less~~.
3. (Currently Amended) The semiconductor device according to claim 2, wherein  
said metal silicate film contains said metal in a peak concentration ~~of 5 in a range from five~~  
atomic % ~~or more and 40 to forty~~ atomic % ~~or less~~.
4. (Currently Amended) The semiconductor device according to claim 1, wherein  
said nitrogen-containing metal silicate film contains said nitrogen in a peak concentration ~~of~~  
10 in a range from ten atomic % ~~or more and 30 to thirty~~ atomic % ~~or less~~.
5. (Currently Amended) A method ~~for~~ of manufacturing a semiconductor device  
comprising ~~the steps for~~:  
forming a base interface layer on a substrate;  
forming a metal silicate film containing a metal in a peak concentration ~~of 1 in a range~~  
from one atomic % ~~or more and 30 to thirty~~ atomic % ~~or less~~ on said base interface layer;

forming a nitrogen-containing metal silicate film containing nitrogen in a peak concentration of ~~10~~ in a range from ten atomic % or more and 30 to thirty atomic % or less on the upper layer of said metal silicate film; and  
forming a gate electrode on said nitrogen-containing metal silicate film.

6. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 5, wherein

~~said step for forming said metal silicate film performs the combination of~~ includes, repeatedly:

~~a first step for forming a metal oxide film by supplying a metal-containing material, and then supplying an oxygen-based gas onto~~ to said substrate; and

~~a second step for forming a silicon oxide film by supplying a silicon-containing material, and then supplying an oxygen-based gas onto~~ to said substrate; and

~~said step for forming said metal silicate film performs said combination of steps~~ includes controlling the number of ~~said first and second steps~~ cycles of forming said metal oxide film and forming said silicon oxide film.

7. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 6, ~~wherein said first step including repeatedly performs the steps for forming said metal oxide film by:~~

supplying said metal-containing material ~~onto~~ to said substrate;  
supplying said oxygen-based gas ~~onto~~ to said substrate; and  
radiating light ~~onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

8. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 6, ~~wherein said second step including repeatedly performs the steps for forming said silicon oxide film by:~~

supplying said silicon-containing material ~~onto~~ to said substrate;  
supplying said oxygen-based gas ~~onto~~ to said substrate; and  
radiating light ~~onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

9. (Currently Amended) A method ~~for~~ of manufacturing a semiconductor device comprising ~~the steps for:~~

forming a base interface layer on a substrate;  
forming a metal silicate film containing a metal in a peak concentration ~~of 5~~ in a range from five atomic % or more and 40 to forty atomic % or less on said base interface layer;  
forming a nitrogen-containing metal silicate film containing a metal in a peak concentration ~~of 1~~ in a range from one atomic % or more and 30 to thirty atomic % or less and nitrogen in a peak concentration ~~of 10~~ in a range from ten atomic % or more and 30 to thirty atomic % or less on said metal silicate film; and  
forming a gate electrode on said nitrogen-containing metal silicate film.

10. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 9, wherein

~~said step for forming said metal silicate film performs the combination of~~ includes, repeatedly:

~~a first step for forming a metal oxide film by supplying a metal-containing material, and then supplying an oxygen-based gas onto~~ to said substrate; and

~~a second step for forming a silicon oxide film by supplying a silicon-containing material, and then supplying an oxygen-based gas onto~~ to said substrate; and

~~said step for forming said metal silicate film performs said combination of steps~~ includes controlling the number of said first and second steps cycles of forming said metal oxide film and forming said silicon oxide film.

11. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 10, ~~wherein said first step including repeatedly performs the steps for forming said metal oxide film by:~~

supplying said metal-containing material ~~onto~~ to said substrate;  
supplying said oxygen-based gas ~~onto~~ to said substrate; and  
radiating light ~~onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

12. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 10, ~~wherein said second step including repeatedly performs the steps for forming said silicon oxide film by:~~

supplying said silicon-containing material ~~onto~~ to said substrate;  
supplying said oxygen-based gas ~~onto~~ to said substrate; and

~~radiating light onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

13. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 9, wherein ~~said step for~~ forming said nitrogen-containing metal silicate film comprises ~~the steps for~~:

forming a base metal silicate film containing a metal in a peak concentration ~~of 1~~ in a range from one atomic % ~~or more and 30~~ to thirty atomic % ~~or less~~; and

introducing nitrogen into said base metal silicate film in a peak concentration ~~of 10~~ in a range from ten atomic % ~~or more and 30~~ to thirty atomic % ~~or less~~ by nitriding said metal silicate film.

14. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim ~~5~~ 13, wherein:

~~said step for~~ forming a base metal silicate film ~~performs the combination of~~; includes:

a first step for forming a metal oxide film by supplying a metal-containing material, and then supplying an oxygen-based gas onto said substrate; and

a second step for forming ~~a metal~~ silicon oxide film by supplying a silicon-containing material, and then supplying an oxygen-based gas onto said substrate; and

~~controls controlling~~ the number of ~~said first and second steps to~~ cycles of forming said metal oxide film and forming said silicon oxide film to form said metal silicate film.

15. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 14, ~~wherein said first step~~ including repeatedly ~~performs the steps for~~ forming said metal oxide film by:

supplying said metal-containing material ~~onto~~ to said substrate;

supplying said oxygen-based gas ~~onto~~ to said substrate; and

~~radiating light onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

16. (Currently Amended) The method ~~for~~ of manufacturing a semiconductor device according to claim 14, ~~wherein said second step~~ including repeatedly ~~performs the steps for~~ forming said silicon oxide film by:

supplying said silicon-containing material ~~onto~~ to said substrate;

supplying said oxygen-based gas ~~onto~~ to said substrate; and

radiating ~~light onto~~ the surface of said substrate with light for ~~a time~~ up to several milliseconds.

17. (Currently Amended) ~~A~~An apparatus for forming a film comprising:  
a housing;  
a table installed in said housing, for ~~placing~~ supporting a substrate;  
a gas supply port for supplying a gas into said housing;  
a gas discharge port for discharging the gas in said housing ~~out of~~ from said housing;  
and  
a heater for heating the surface of ~~said~~ a substrate supported on said table by radiating light on to the surface of ~~said~~ the substrate placed on said table for ~~a time~~ up to several milliseconds.

18. (Original) The apparatus for forming a thin film according to claim 17 wherein said heater includes a flash lamp.

19. (Currently Amended) A method ~~for~~ of forming a high-dielectric-constant film on a substrate comprising ~~the steps for~~:

supplying a first ~~material~~ source gas that contains at least one element ~~in~~ of elements constituting ~~said~~ a high-dielectric-constant film into a housing ~~wherein said~~ where a substrate is ~~placed~~ located;

supplying a second ~~material~~ source gas ~~that reacts into the housing, the second source gas reacting with said first material source gas and forms said~~ forming the high-dielectric-constant film ~~into said housing; and~~

heating the surface of ~~said~~ the substrate by radiating ~~light onto~~ the surface of ~~said~~ the substrate with light for ~~a time~~ up to several milliseconds.

20. (Currently Amended) The method for forming a high-dielectric-constant film according to claim 19, ~~wherein the time for~~ including radiating the substrate with light in said heating step is from for a time in a range of 0.8 to 20 miliseconds.